Mumps

Signs and Symptoms	Fever, headache, muscle aches, tiredness, hearing loss, loss of appetite, often followed by parotitis (swelling of salivary glands). After puberty, can cause painful, swollen testicles (males) or ovaries (females). Other presentations: Aseptic meningitis, encephalitis, pancreatitis. Can be asymptomatic. Parotitis is not always present.		
Incubation	Usually 16-18 days after exposure (range 12-25 days).		
Case classification	**Clinical definition:** Acute parotitis or other salivary gland swelling. Mumps-associated complications include: Orchitis, Oophoritis, Aseptic meningitis, Encephalitis, Hearing loss, Mastitis, and Pancreatitis		
	Confirmed case: Meets confirmatory laboratory evidence: Positive reverse transcriptase polymerase chain reaction (RT-PCR) for mumps-specific nucleic acid, **OR** Isolation of mumps virus, **OR** Significant rise in paired acute and convalescent serum mumps immunoglobulin G (IgG) antibody	**Probable case:** Meets clinical criteria **AND** epidemiologic linkage criteria, **OR** Meets supportive laboratory evidence AND Meets clinical criteria of: ≥2-day duration of parotitis or other salivary gland swelling **OR** a mumps-related complication **AND** Does NOT meet epidemiologic linkage criteria	**Suspected case:** Meets the clinical criteria but does not meet laboratory or epidemiologic linkage criteria, **OR** Meets supportive laboratory evidence but does not meet the clinical criteria AND has documentation that mumps was suspected
Differential diagnosis	EBV, HHV-6, cytomegalovirus, parainfluenza virus 1 & 3, influenza A, coxsackie, tumors, immunologic disease, salivary duct obstruction. Important for sporadic cases of parotitis with no high-risk exposure.		
Treatment	Supportive therapy		
Laboratory	**Buccal and urine for RT-PCR:** PHL performs this test. Mumps can be most reliably diagnosed by isolation of mumps virus or detection of mumps nucleic acid by PCR assay from buccal mucosa secretions. • Days 0-3 after parotitis onset (onset date is day 0): Collect buccal swab only. (IDEAL) • Days 4-10 after parotitis onset: Collect both buccal swab AND urine specimen. **Serum for mumps IgM and IgG antibody detection:** In general, serum can be sent commercially; request both IgM & IgG. Please note: Follow up to determine IgG results will be important for patients with unknown vaccination status, since a negative PCR cannot rule out mumps on a person previously exposed to mumps antigen, either by vaccination or previous infection. *If unvaccinated:* collect at first clinical encounter; If IgM negative within 5d of onset, collect another specimen to rule in/out. IgM reliably present ≥5d post-onset. *If vaccinated*: take acute specimen at 1st clinical encounter; IgM may not be detectable in vaccinated persons with mumps regardless of collection timing. *Please refer to PHL Mumps IgG, IgM and specimen collection instructions.* Submit according to PHL requirements: https://doh.wa.gov/public-health-provider-resources/public-health-laboratories/lab-test-menu		

Public Health investigation	• Assess the likelihood of mumps: confirm compatible clinical symptoms, verify vaccination and travel history, and assess exposure risk such as contact with a person with mumps or linkage to a community with a mumps outbreak.
	• Collect specimens as soon as mumps is suspected; arrange testing at PHL as appropriate.
	• Recommend immediate isolation of case (droplet precautions) for 5 days after parotitis onset.
	• Recommend appropriate infection control precautions to prevent additional exposures in healthcare facilities, schools, workplaces, and other public settings.
	• Identify close contacts of all suspected cases to assess their immune status.
	  ○ Refer symptomatic contacts for evaluation by HCP and exclude from school, work, & childcare.
	  ○ Refer susceptible contacts and contacts w only 1 MMR dose or an unknown vaccination history for one dose of MMR vaccine. (All may return to school after a dose has been received)
	  ○ Recommend that exposed persons with 1 MMR receive a 2nd dose (>28d after date of 1st dose).
	• Educate potentially exposed contacts to watch for symptoms for 12 days after the first exposure through 25 days after last exposure and seek immediate evaluation if symptoms occur.
	• If in health care setting, exclude exposed HCWs without documented immunity (2 MMRs) from the 12th day after the first exposure through the 25th day after last exposure.
	• Provide appropriate notifications to childcare centers, schools, and care facilities.		

Mumps

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To assess the burden of mumps in Washington.
2. To identify cases in order to prevent further spread from cases by recommending appropriate preventive measures, including exclusion.
3. To educate potentially exposed individuals about signs and symptoms of disease, thereby facilitating early diagnosis and reducing the risk of further transmission.
4. To identify and vaccinate susceptible individuals.

B. Legal Reporting Requirements

1. Health care providers and health care facilities: notifiable to local health jurisdiction within 24 hours.
2. Laboratories: Mumps virus, acute, by IgM positivity or PCR positivity notifiable to local health jurisdiction within 24 hours; specimen submission of isolate or clinical specimen associated with positive result is required* (2 business days).
   *In practice, submission of these specimens generally occurs only upon request rather than routinely.
3. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Communicable Disease Epidemiology (CDE) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin routine case investigation within one working day.
2. Facilitate the transport of specimens to assist with the diagnosis of cases.
3. Recommend measures to prevent further spread from the case.
4. Identify and evaluate contacts; educate and recommend measures to prevent further spread from susceptible contacts.
5. Report all confirmed and probable cases as well as suspected cases with possible exposure to mumps to Communicable Disease Epidemiology (see Section 3).
6. Complete the mumps case report form (https://www.doh.wa.gov/Portals/1/Documents/5100/210-039-ReportForm-Mumps.pdf) and enter the data into the Washington Disease Reporting System (WDRS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Mumps is caused by a single-stranded RNA paramyxovirus.

B. Description of Illness

The classic symptom of mumps is parotitis (i.e., acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary glands), lasting at least two days, but may persist up to ten days or longer. Nonspecific prodromal symptoms may precede parotitis by several days, including low-grade fever which may last three to four days, myalgia, anorexia, malaise, and headache. However, mumps infection may present only with nonspecific or symptoms or may be a subclinical infection. Rates of classic parotitis among all age groups typically range from 31% to 65%, but in specific age groups can be as low as 9% or as high as 94% depending on the ages and immunization histories of the individuals in the group. Parotitis may be unilateral or bilateral, and any combination of single or multiple salivary glands may be affected. Parotitis tends to occur within the first 2 days and may first be noted as earache and tenderness on palpation of the angle of the jaw. Symptoms tend to decrease after one week and usually resolve after 10 days.

Persons with history of potential exposure to mumps who have pain in their testes (males) or pelvic area (females) should be evaluated by their health care provider for potential orchitis (testicular inflammation) or oophoritis (ovarian inflammation not related to bacterial infection).

Before the introduction of the mumps vaccine in the United States in 1967, 15% to 27% of infections were asymptomatic. The proportion of infections that are asymptomatic since the introduction of the vaccine has not been clearly determined. Persons with asymptomatic infection can transmit the virus.

Mumps complications:

- **Orchitis** (testicular inflammation) is the most common complication of mumps in post-pubertal males. In the pre-vaccine era, orchitis was reported in 12 – 66% of males who get mumps after puberty. Orchitis usually occurs 1-2 weeks (average 4-8 days) after onset of parotitis. In mumps-associated orchitis, the onset is usually abrupt and includes swelling, tenderness, nausea, vomiting, and fever. Only one testicle is affected in 60-83% of male mumps cases with orchitis. Mumps orchitis rarely leads to sterility but it may contribute to subfertility. An estimated 1 in 10 men experience a decrease in their sperm count. However, this drop is very rarely large enough to cause infertility.
- **Oophoritis.** Historically, about one in 20 females who got mumps after puberty experienced swelling of the ovaries or oophritis (ovarian inflammation). In the 2006 and 2009–2010 U.S. mumps outbreaks, oophoritis rates were 1% or lower among post-pubertal females. The symptoms of oophoritis (lower abdominal pain, high temperature, feeling sick) usually pass once the underlying mumps infection is cleared. It may mimic appendicitis. There is no known relationship to impaired fertility.
- **Aseptic meningitis**. In the pre-vaccine era, mumps accounted for approximately 10% of cases of symptomatic aseptic meningitis (inflammatory cells in cerebrospinal fluid

resulting in headache or stiff neck). Men were afflicted three times as often as women. Aseptic meningitis resolves without sequelae in 3 to 10 days.

- **Mumps encephalitis** accounted for 36% of all reported encephalitis cases in the United States in 1967. The incidence of mumps encephalitis is reported to range from 1 in 6,000 mumps cases (0.02%) to 1 in 300 mumps cases (0.3%).
- **Mastitis** has been reported in up to 31% of females older than 15 years of age who have mumps.
- **Pancreatitis** was reported in 3.5% of persons infected with mumps in one community during a two-year period prior to the availability of vaccine and was also described in case reports. Pancreatitis is infrequent, but occasionally occurs without parotitis. It causes hyperglycemia that is transient and reversible. Although single instances of diabetes mellitus have been reported, a causal relationship with mumps virus infection has yet to be conclusively demonstrated.
- **Hearing loss**. In the pre-vaccine era, mumps caused transient deafness in 4.1% of infected adult males (in a military population). Permanent unilateral deafness caused by mumps occurred in 1 of 20,000 infected persons. Bilateral, severe hearing loss was very rare.

In the post-vaccine era, among all persons infected with mumps, reported rates of meningitis, encephalitis, pancreatitis, and deafness have all been less than 1%. Permanent sequelae such as paralysis, seizures, cranial nerve palsies, and hydrocephalus occurred very rarely, even in the pre-vaccine era. Although, in the United States during 1966–1971 there were two deaths per 10,000 reported mumps cases, there were no mumps-related deaths in recent U.S. outbreaks.

Although mumps virus is the only agent known to cause epidemic parotitis, not all cases of parotitis are caused by mumps virus. Sporadic parotitis can also occur as a result of infection with other viral pathogens such as enteroviruses (including coxsackievirus), parvovirus B-19, adenoviruses, parainfluenza virus (PIV) types 1 – 3, influenza A and B, human herpesviruses 6 (HHV-6), Epstein-Barr virus (EBV), and bocavirus (HBoV)* as well as infection with *Staphylococcus aureus* and other bacteria. Additionally, non-infectious causes of parotitis include drugs, tumors, immunologic diseases, and obstruction of the salivary duct. Current mumps diagnostics do not satisfactorily identify cases in previously vaccinated people; thus, a negative laboratory test result for mumps cannot rule out the disease in these individuals. Also, testing for alternative causes of parotitis is not routinely done unless symptoms or history suggest alternate diagnosis. Because of this, most mumps antibody–negative cases of parotitis in persons previously exposed to mumps either by vaccination or by having the disease, especially when symptoms last two days or more, must still be considered as suspected mumps.

*Viruses Detected Among Sporadic Cases of Parotitis, United States, 2009-2011. Barsky, et. al., The Journal of Infectious Diseases 2013;208:1979–86.

C. Mumps in Washington State

During 2013 and 2022, the number of probable and confirmed cases reported each year varies, ranging from one to 779 (during the 2016-17 multistate outbreak) cases a year. In the

five years prior to the 2016-17 outbreak, the number of probable and confirmed cases reported each year ranged from two to nine cases.

The national mumps case definition most recently changed in 2012 making anyone with two days parotitis and a positive IgM a probable case. Washington State did not fully implement this change until January 2017 following a mumps outbreak in highly vaccinated persons that began in late 2016*.

* In Washington State, persons with 2 documented doses of mumps vaccine that were reported to have 2 days of parotitis and a positive IgM with no other testing were classified as suspect cases from 2012 through 2016.

D. Reservoir

Humans are the only known reservoir.

E. Modes of Transmission

Transmission occurs through respiratory droplets or through direct contact with nasopharyngeal secretions.

F. Incubation Period

The incubation period is usually 16–18 days but can range from 12–25 days after exposure.

G. Period of Communicability

Mumps virus has been found in respiratory secretions as early as 7 days before the start of symptoms and up to 9 days after onset. The highest viral loads occur closest to the onset of parotitis and decrease rapidly after. Mumps is considered infectious 2 days before through 5 days after the onset of parotitis and is the recommended period for contact tracing.

H. Treatment

Treatment is supportive.

I. Immunity

In general, immunity is considered lifelong and develops after either clinical or inapparent infections. Most adults that were born before 1957 are likely to have been infected naturally and may be considered to be immune, serologic evidence of mumps immunity (equivocal tests are considered negative), or laboratory confirmation of disease or documentation of adequate vaccination for mumps. (see section 5.C)

Mumps IgG antibody does not necessarily predict protection; during an outbreak, close contacts of mumps patient(s) should not be tested for serologic evidence of immunity because a positive IgG titer may indicate an acute infection.

Recent evidence suggests that persons previously exposed to the virus through either vaccination or disease may still become infected.

3. CASE AND CONTACT DEFINITIONS

A. Case Definition 2023

Clinical Criteria

In the absence of a more likely alternative diagnosis, an acute illness characterized by:

Parotitis or swelling of other (non-parotid) salivary glands(s) of any duration,

OR

At least one of the following mumps-related complication(s):

- Orchitis
- Oophoritis
- Aseptic meningitis
- Encephalitis
- Hearing loss
- Mastitis
- Pancreatitis

Confirmatory Laboratory Evidence:

Positive reverse transcriptase polymerase chain reaction (RT-PCR) for mumps-specific nucleic acid*, OR

Isolation of mumps virus, OR

Significant rise (i.e., at least a 4-fold rise in a quantitative titer or seroconversion) in paired acute and convalescent serum mumps immunoglobulin G (IgG) antibody. *

Supportive Laboratory Evidence:

Positive test for serum mumps immunoglobulin M (IgM) antibody*

*Not explained by MMR vaccination during the previous 6-45 days.

Epidemiologic Linkage Criteria

Exposure to or contact with a confirmed mumps case, OR
Member of a group or population identified by public health authorities as being at increased risk for acquiring mumps because of an outbreak

***Suspected*:** Meets the clinical criteria but does not meet laboratory or epidemiologic linkage criteria, OR

Meets supportive laboratory evidence but does not meet the clinical criteria AND has documentation that mumps was suspected

Probable:

- Meets clinical criteria AND epidemiologic linkage criteria, OR
- Meets supportive laboratory evidence AND
    - Meets clinical criteria of:
    - ≥2-day duration of parotitis or other salivary gland swelling OR
    - a mumps-related complication

  AND
- Does NOT meet epidemiologic linkage criteria

***Confirmed*:** Meets confirmatory laboratory evidence.

Comment

As a result of previous contact with mumps virus either through vaccination (particularly with 2 doses) or natural infection, mumps serologic IgM test results may be negative even when the person is infected; IgG test results may be positive at initial blood draw and viral detection in RT-PCR or culture may have low yield. **Mumps cases in persons previously**

exposed to mumps antigen cannot be ruled out by negative laboratory results. Serologic tests should be interpreted with caution, as false positive and false negative results are possible with IgM tests.

Reported mumps cases in WA State should be assigned case classifications based on mumps laboratory test results as follows:

Laboratory Test Result:	**Case Classification:**
Isolation of mumps virus from clinical specimen	**Confirmed**
Detection of mumps nucleic acid (RT-PCR assay)	**Confirmed**
Detection of mumps IgM antibody Not explained by MMR vaccination during the previous 6-45 days May be ruled out by a negative convalescent mumps IgG antibody	**Supportive**
Demonstration of seroconversion (in the absence of recent vaccination) from negative to positive using a standard serologic assay for mumps-specific IgG antibody in paired acute and convalescent serum specimens.	**Confirmed**

B. Close Contacts (of a person with mumps)

Mumps spreads by direct contact with infectious respiratory secretions by droplet transmission. Such droplets generally travel 3 feet or less when an infected person talks, coughs, or sneezes. The risk of transmission of mumps is a function of multiple factors including clinical features of the source case as they relate to communicability (e.g., stage of illness, the presence and character of any respiratory symptoms), proximity and duration of contact, ventilation, and use of appropriate infection control measures (mask, eye protection).

Examples of close contact that could facilitate the transmission of mumps include:

1. **Direct face-to-face contact** with a symptomatic case-patient during the contagious period. This includes household and immediate family members, boyfriends/girlfriends, and childcare contacts (those who spend many hours together or live in the same household).
2. **An obvious exposure** that involves direct contact with respiratory, oral, or nasal secretions from a case-patient during the contagious period (e.g., a cough or sneeze in the face, sharing of eating utensils, sharing of water bottles, kissing, mouth-to-mouth resuscitation, or performing intubation or nasotracheal suctioning without a mask).
3. **Close proximity for a prolonged period of time** with a case-patient during the contagious period. Risk of droplet exposure increases with longer duration and closer proximity of contact.

   Examples of persons who may be at increased risk include:

   a. non-household close friends or other social contacts
   b. some passengers during shared transportation
   c. some contacts at community activities or at the place of employment
   d. some healthcare workers caring for a case without wearing a mask
   e. children attending an after-school care group or play group on the same days

Note: Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

Unvaccinated and vaccinated people with clinically consistent disease, without other apparent cause should undergo diagnostic testing to confirm a mumps a diagnosis. Mumps can most reliably be diagnosed by isolation of mumps virus or detection of mumps nucleic acid by RT- PCR assay. Buccal swabs are the preferred sample, but mumps virus may also be detected in urine. Obtaining timely and appropriate specimens for these tests is highly important.

1. **Viral culture and detection of mumps nucleic acid by RT-PCR assay**: For mumps RT-PCR, specimen should be ideally collected 0-3 days after parotitis onset but can be collected up to 10 days. If >10 days since symptom onset, PCR testing no longer recommended.

   An accompanying urine sample may be useful if collection of the buccal swab has been delayed. Unlike buccal specimens, urine samples may not be positive for mumps virus until ≥4 days after symptom onset. Urine specimens should be collected no later than 10 days after parotitis onset.

   Successful detection of mumps virus depends primarily on the timing of collection and quality of the clinical sample, a negative culture and/or RT-PCR assay cannot rule out the diagnosis of mumps. Vaccinated people may shed virus for a shorter period and may shed smaller amounts of virus.

2. **Serologic testing:**

   Detection of mumps immunoglobulin M (IgM) is suggestive of an active mumps infection and can aid in the diagnosis of mumps, it is supportive laboratory evidence only. The ability to detect IgM in persons infected with mumps can vary according to vaccination status and the timing of specimen collection. Specimens collected ≥ 3 days post-parotitis onset are more likely to have a positive IgM result than those collected earlier. A negative IgM does not rule out infection in a vaccinated person or those previously infected with clinically compatible mumps.

   In vaccinated patients, immunoglobulin G (IgG) antibody may confirm a mumps diagnosis **if** paired acute and convalescent sera show at least a fourfold rise in IgG titer. IgG levels in previously vaccinated individuals may rise rapidly after exposure or infection. By the time an acute sample is collected, IgG levels may already be quite high, precluding the possibility of detecting a 4-fold rise in a convalescent specimen. Quantitative IgG antibody titer testing is available at CDC (see the https://www.cdc.gov/laboratory/specimen-submission/detail.html?CDCTestCode=CDC-10351).

   Detection of mumps IgG antibody provides presumptive evidence of previous infection or vaccination. The presence of mumps-specific IgG antibodies may not provide protection from mumps infection. Those previously exposed to the virus through either

vaccination or disease may still become infected. A single serum sample tested for mumps-specific IgG is not useful for diagnosing acute mumps infections.

IgM peaks at about 1 week and can be present for at least 6 weeks. IgG becomes detectable shortly after IgM is present.

For additional information regarding laboratory testing for mumps infection, see: https://www.cdc.gov/mumps/lab/index.html.

B. Tests Available at the Washington State Department of Health Public Health Laboratories (PHL)

PHL will generally perform RT-PCR for mumps virus on buccal swabs and urine specimens from persons suspected to have mumps once testing has been approved by the local health jurisdiction.

In most cases, if serologic testing is desired, serum can be sent commercially, and both IgM and IgG results should be requested. Follow up to determine IgG results will be important for patients with unknown vaccination status, since a negative RT-PCR cannot rule out mumps on a person previously exposed to mumps antigen, either by vaccination or previous infection.

With any of the commercially available assays for mumps-specific IgM, false positive IgM results can be a problem. The following caveats should be relayed to the health care provider whenever possible:

- IgM test methods and kits vary in their sensitivity and specificity, they do not reliably rule out mumps in an individual previously exposed to mumps antigen, either through previous disease or by history of vaccination.
- False positive IgM results can occur, particularly when testing is being performed in a low prevalence population (i.e., people who do not meet the clinical case definition, people with no obvious risk factors for mumps, and people that have received 2 documented doses of mumps-containing vaccine.). In such instances, when a positive IgM result is obtained, the result should be interpreted with caution.
- If the patient is not fully vaccinated or has risk factors for mumps and a positive IgM result is obtained, further testing will be recommended to confirm the diagnosis. A positive IgM is supportive laboratory evidence only.

In some circumstances, when public health interventions are contingent upon the confidence that a case is truly mumps, the local jurisdiction could request serologic testing at WA PHL. For example, if viral specimen collection was delayed beyond the recommended specimen collection times (i.e., if more than 10 days has passed since the onset of parotitis) in an unimmunized case with high-risk exposures, testing could be performed at PHL to facilitate more rapid turnaround of IgM results, as well as paired IgG serology testing. Additionally, if a positive IgM is reported by a commercial laboratory, PHL can help assure accurate results through EIA testing as well as more specific capture IgM testing at CDC. If serology testing is being considered at PHL, please call DOH Communicable Disease Epidemiology (CDE) to discuss and arrange testing.

All requests for mumps testing at PHL must have approval from the local health jurisdiction, in consultation with an epidemiologist in Communicable Disease Epidemiology (CDE) at 206-418-5500.

C. Specimen Collection

Following receipt of approval from the local health jurisdiction and CDE, healthcare providers should be encouraged to collect the following specimens for submission to PHL

Specimens for RT-PCR (Preferred)

- Collect as soon as mumps is suspected for optimal detection/isolation.
  - Days 0-3 after parotitis onset (onset date is day 0): Buccal swab only.
  - Days 4-10 after parotitis onset: Buccal swab and urine specimen.
- Consult CDE for testing options if collection is delayed >10 days after parotitis onset.
- **Buccal Swab**
  - Massage the parotid gland for about 30 seconds prior to collecting specimen.
  - Place the appropriate swab between rear molars and cheek (on the affected side if parotitis is unilateral) and leave in place for 10–15 seconds.
  - Place both swab in a tube containing appropriate transport media
  - CDC collecting a buccal swab: https://youtu.be/ThvoJBjsUvQ?si=zdRPZiKP58cVU2Tc
    Submit according to PHL requirements: https://doh.wa.gov/public-health-provider-resources/public-health-laboratories/lab-test-menu

Urine Specimen

- Collect a minimum of 20 ml of clean voided urine (50 ml preferred) in a sterile screw-capped container.

Serologic testing for mumps:

- In most cases, if serologic testing is desired, serum can be sent commercially, and both IgM and IgG results should be requested. Please note: Follow up to determine IgG results will be important for patients with unknown vaccination status, since a negative PCR cannot rule out mumps on a person previously exposed to mumps antigen, either by vaccination or previous infection.

D. Specimen Shipping

All specimens must be ordered through WAPHL Lab Web Portal, accessed through Secure Access Washington (SAW). Specimens must be labeled with patient name, additional identifier such as date of birth. submitter name, date of collection, date of onset of symptoms, symptoms, and vaccination history.
Specimens will be rejected for testing if not properly identified.

5. ROUTINE CASE INVESTIGATION

Interview the case and others who might be able to provide pertinent information. Review medical records if accessible.

A. Evaluate the Diagnosis

Since parotitis can be caused by many other conditions, review the clinical presentation and laboratory test results, if available. Facilitate the transport of specimens to Public Health Laboratories to confirm the diagnosis as needed. Proceed with a public health investigation for all *suspected, probable,* and *confirmed* cases.

B. Identify Source of Infection

Attempt to determine if a suspected case was in contact with a known case or had recently traveled to an area where mumps transmission is being reported or where mumps is endemic.

C. Identify Exposed, Susceptible Close Contacts

Identify persons who had close contact (see Section 3C) with the case during the communicable period. Determine whether contacts can be considered immune or should be considered susceptible to mumps infection. Acceptable presumptive evidence of immunity to mumps includes one of the following:

- Documentation of adequate vaccination*,
    - Laboratory evidence of immunity,
    - Birth before 1957, or
    - Documentation of laboratory confirmation of disease

*Presumptive evidence of immunity through documentation of adequate vaccination is defined as:

1 dose of a live mumps virus vaccine for preschool-aged, after their first birthday.

School-aged children (grades K-12) and adults at high risk (i.e., health care personnel, international travelers, and students at postsecondary educational institutions): 2 doses after their first birthday, with the second dose administered at least 28 days after the first dose.

Adults not at high risk, at least 1 dose is necessary.

Documentation of immunization is preferable, but serologic testing for IgG can be performed for exposed contacts that do not have proof of immunity.

The following are considered evidence of immunity for **healthcare providers**

- written documentation of vaccination with 2 doses of live mumps or MMR vaccine administered at least 28 days apart,
    - The first dose of mumps-containing vaccine should be administered on or after the first birthday; the second dose should be administered no earlier than 28 days after the first dose
- laboratory evidence of immunity
- laboratory confirmation of disease, or
- birth before 1957
    - For unvaccinated personnel born before 1957 who lack laboratory evidence of mumps immunity or laboratory confirmation of disease, healthcare facilities should consider vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval

During an outbreak of mumps, unvaccinated personnel born before 1957 who lack laboratory evidence of mumps immunity or laboratory confirmation of disease and healthcare personnel, healthcare facilities should consider 2 doses of MMR vaccine.

D. Environmental Evaluation

None

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations

1. Hospitalized patients should be cared for using droplet precautions until 5 days after the date of parotitis onset.
2. Cases (including suspected cases) should stay home and not go to school, work, public places or social activities until 5 full days have passed since the date of parotitis onset. Family members who are not immune should avoid contact during the time the case is infectious. Healthcare workers with mumps illness should be excluded from work until the 6th day after the onset of parotitis, with the date of onset being day 0.
3. Cases should be taught "respiratory etiquette" (see section 8B).

B. Case Management

No further public health actions are required after the above infection control measures have been implemented.

C. Contact Management

1. Symptomatic Contacts

All close contacts with symptoms compatible with mumps should be referred to a healthcare provider for assessment and potential laboratory testing; the healthcare provider should be made aware of the specific reason for referral.

2. Exclusion

All symptomatic close contacts should be excluded from school, workplace and childcare (regardless of immunization status) until they have been evaluated for possible mumps.

Exclusion of susceptible students from school settings during mumps outbreaks should be considered in certain circumstances (e.g., when severe illnesses occur beyond expected rates, when susceptible students are thought to be a major factor in disease transmission.)

During mumps outbreaks, all susceptible students without a medical contraindication should be immunized with MMR vaccine, and all symptomatic cases must be excluded from the school setting and from contact with the public until 5 days after the onset of parotitis. Parents should be informed of the risk of mumps to both vaccinated and susceptible students during school outbreaks. Families of children susceptible to mumps, including children with underlying medical conditions or a medical contraindication to MMR vaccine, should discuss the risks and benefits of remaining in the school setting with their healthcare provider.

Schools:

In the setting of a mumps outbreak in a school, if pupils who are exempted from immunization for any reason are excluded, the exclusion period should be through 26 days after the last known exposure. Excluded susceptible students who choose to be vaccinated can be readmitted immediately after immunization.

Healthcare workers exposed to a person with mumps:

Exposed healthcare personnel without acceptable evidence of immunity should be excluded from the 12th day after the first unprotected exposure to mumps through 25 days after the last exposure. The mumps vaccine cannot be used to reliably prevent the development of mumps after exposure in high-risk environments like healthcare facilities. Hence, previously unvaccinated healthcare personnel who receive a first dose of vaccine after an exposure should still be considered non-immune and must be excluded as described above.

Exposed healthcare personnel who had been previously vaccinated for mumps, but received only one dose of mumps vaccine may continue working following an unprotected exposure to mumps. Such workers should receive a second dose as soon as possible, but no sooner than 28 days after the first. They should be educated about symptoms of mumps, including non-specific presentations, and should notify occupational health if they develop symptoms consistent with mumps in the 25 days after the last known exposure.

Exposed healthcare personnel who are immune do not need to be excluded from work following an unprotected exposure. However, because 1 dose of MMR vaccine is about 78% effective in preventing mumps and 2 doses are about 88% effective, some vaccinated personnel may remain at risk for infection. Therefore, healthcare workers should be educated about symptoms of mumps, including non-specific presentations, and should stay away from the work environment and notify occupational health if they develop these symptoms in the 25 days after the last known exposure.

3. Immunization

Mumps vaccine has not been shown to be effective in preventing disease following an exposure to an infected person. If susceptible contacts are vaccinated after exposure, the exclusions mentioned above still apply. However, vaccination of susceptible contacts will protect against disease from future exposures. Individuals who have had documented mumps disease do not need to receive the mumps vaccine. Immune globulin (IG) and is not recommended after exposure to mumps.

Preschool children (ages 1–4 years) and adults not at high risk should receive 1 dose of mumps vaccine in the form of MMR (measles, mumps, rubella) vaccine; for children in grades K–12 and adults at high risk (i.e., persons who work in healthcare facilities, international travelers, and students in post-high school educational institutions), 2 doses of MMR are recommended.

In an outbreak situation, an additional dose of MMR vaccine can be offered to those who are determined to be at increased risk for acquiring mumps. Everyone who is determined to be at increased risk should receive a dose of MMR regardless of any form of presumptive evidence of immunity. Even for individuals with two documented doses, a third dose of MMR is safe, and may help limit the spread of an outbreak.

4. Education

All close contacts, regardless of immunity status, should be educated on the signs/symptoms of mumps and told to watch for these signs/symptoms from the 12th day after the first exposure through 25 days after the last exposure. If symptoms develop in these contacts during that time period, they should have an understanding that respiratory etiquette (see Section 8B) must be followed that and medical care should be sought promptly; remember, the healthcare providers of exposed contacts should be made aware of the mumps exposure in order to appropriately evaluate the patient for mumps and limit risk to others in the office.

D. Environmental Measures

None

7. MANAGING SPECIAL SITUATIONS

A. Mumps in Healthcare Settings

For additional information regarding Prevention and Control of Mumps in Healthcare Settings, see: https://www.cdc.gov/mumps/hcp.html.

8. ROUTINE PREVENTION

A. Immunization Recommendations

A live attenuated mumps virus vaccine (Jeryl Lynn strain) was introduced in the United States in 1967 and is available in combination with rubella and measles live virus vaccines (MMR).It is licensed for use in persons age 12 months or older. In 2005, a combination measles, mumps, rubella, and varicella (MMRV) vaccine was licensed for administration for persons 12months through 12 years. MMRV should not be administered to those 13 years or older. Routine immunization with MMR is recommended during childhood; Two doses of MMR vaccine, separated by at least 4 weeks, are routinely recommended for children age 12 months or older. Dose 1 of MMR vaccine should be given at age 12 through 15 months. The second dose is routinely given at age 4 through 6 years. After a risk/benefit discussion with the provider, MMRV is preferred for dose 2 and dose 1 at age 48 months or older. Approximately 94% of recipients develop antibodies after a single dose. Seroconversion rates are similar for MMR and MMRV vaccine. Vaccine effectiveness of one dose of mumps or MMR vaccine was 78% and two dose mumps vaccine effectiveness is 88%.

Mumps vaccine is also available as a combined mumps, measles, rubella and varicella vaccine (MMRV) (MMWR 2010;59(RR03):1-12).

For more vaccine information including vaccine safety and contraindications please see the Pink Book: https://www.cdc.gov/vaccines/pubs/pinkbook/mumps.html

B. Prevention Recommendations

In addition to immunization, persons should practice “respiratory etiquette” or good health manners to stop the spread of respiratory pathogens.

Persons can keep respiratory pathogens to themselves by:

- Covering the nose and mouth with a tissue when sneezing, coughing or blowing the nose.

- Throwing out used tissues in the trash as soon as possible.
- Always washing hands after sneezing, blowing the nose, or coughing, or after touching used tissues or handkerchiefs.
- Washing hands often when sick.
- Using warm water and soap or alcohol-based hand sanitizers to wash hands.
- Staying home if coughing and febrile.
- Seeing a doctor as soon as possible if coughing and febrile, and following their instructions, including taking medicine as prescribed and getting lots of rest.
- Wearing a face mask or respirator, especially in a healthcare setting.

Persons can keep pathogens away by:

- Washing hands before eating, or touching eyes, nose or mouth.
- Washing hands after touching anyone else who is sneezing, coughing, blowing their nose, or whose nose is running.
- Not sharing things like cigarettes, towels, lipstick, toys, or anything else that might be contaminated with respiratory germs.
- Not sharing food, utensils or beverage containers with others.

ACKNOWLEDGEMENTS

This document is a revision of the Washington State Guidelines for Notifiable Condition Reporting and Surveillance published in 2002 which were originally based on the Control of Communicable Diseases Manual (CCDM), 17th Edition; James Chin, Ed. APHA 2000. We would like to acknowledge the Oregon Department of Human Services for developing the format and select content of this document.

UPDATES

December 2007 Revisions

Section 3B: Revisions were made to the examples of close contact.

March 2008 Revisions

Section 3A: The case definition was updated.

October 2008 Revisions

Section 2G: A reference was added for the period of communicability.

Section 4A: Information was added regarding laboratory testing.

Section 6A: The recommendation for the duration of isolation for persons with mumps in health care settings was updated (MMWR 2008;57 [No.40]:1103–4).

Section 6C: The recommendation for the duration of exclusion for exposed, non-immune health care providers was updated (MMWR 2008;57 [No.40]:1103–4).

July 2010 Revisions

Section 4D: Information was added to describe the state's new enhanced surveillance for alternative parotitis etiology testing in collaboration with CDC.

An oropharyngeal swab and an additional buccal swab are now requested as additional specimens to be collected and forwarded to PHL.

- Updated information in the laboratory section about optimal timing of buccal specimen collection.
- Add information related to MMRV in the immunization section.
- Update the start of the exclusion from work period for health care workers exposed to person with mumps from the 12th day after first unprotected exposure to the 9th day after first unprotected exposure. (There is no change in the exclusion through 25 days following the last exposure.)

October 2010 Revision

Information about enhanced surveillance for alternative etiology testing was temporarily removed pending a determination of exempt status by the Washington State Institutional Review Board (WSIRB.)

January 2011:

The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision.

Section 6C2: A note added to clarify the period of communicability for the purpose of outbreak control and management of exposed susceptible persons.

Section 4D: Information about enhanced surveillance for alternative etiology of sporadic parotitis reinserted following a determination of exempt status by WSIRB.

March 2014:

Section 2C: Updated Washington State mumps incidence information to the present.

Section 3A:

- The case definition was updated to reflect the 2012 national definition.
- Supplemental guidance specific to mumps surveillance in Washington State (differs from the national case definition in that reported cases with 2+ doses of vaccine and no high risk exposure will continue to be classified as suspected cases in WA, regardless of IgM test results when only serology is done.)
- A table regarding how cases should be classified based on lab test results was added.

Section 4B: Updated guidance regarding specimen submissions to PHL; an algorithm was included.

January 2017:

Section 3A: The case definition was updated to align with national mumps case definition and supplemental case classifications guidance specific to mumps surveillance in WA State (including an algorithm for routing mumps specimens for testing) were removed.

Section 4:

- Specimen collection and submission guidance was updated to include urine.
- Guidance for circumstances in which commercial versus PHL serology testing should be considered was added.
- Links to the WA PHL lab test menu and the mumps specimen handling guidelines were added.

February 2017:

Section 6.C.2: Changed timing of exclusion for exposed susceptible health care workers from 9 days after initial exposure to 12 days after initial exposure.

September 2017:

Section 6.C.2: Modified the language regarding exclusion of susceptible students as a mumps control strategy during outbreaks to allow the local Health Officer maximal flexibility in considering the circumstances of the outbreak when deciding whether the use of exclusion should be implemented.

May 2022:

Section 2.C: Updated lab test menu links to reflect updated WA PHL serology testing guidance

January 2024:

Case definition updated to 2023 CSTE recommendations

Outbreak immunization recommendations updated according to APIC 2017 recommendations

Included MMRV vaccine information

ADA wording updated

June 2024

Standard review: CDC links updated